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May 9, 1953

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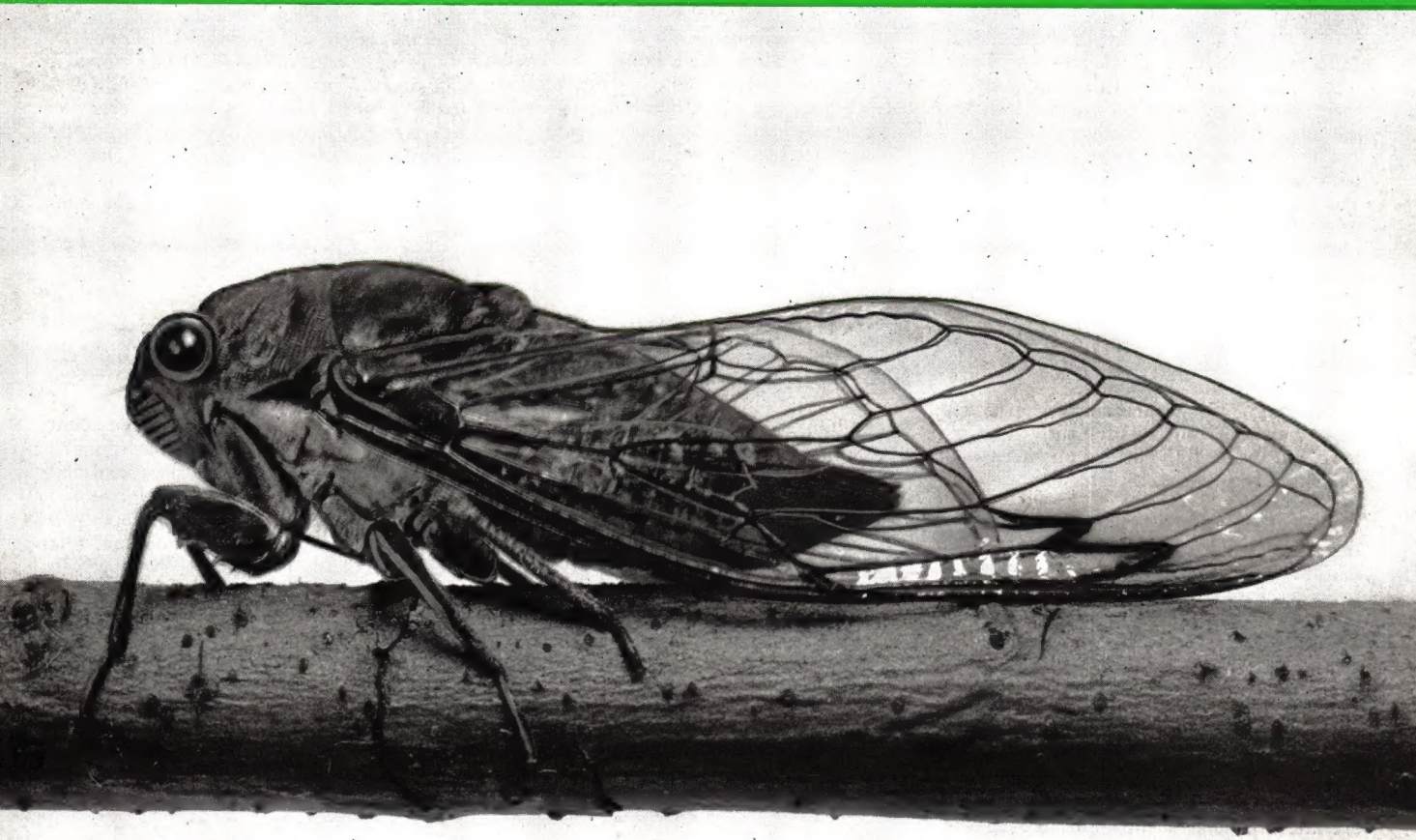
SCIENCE NEWS LETTER®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



After 17 Years

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A SCIENCE SERVICE PUBLICATION

ELECTRONICS

VHF Mountain Reception

Discovery of "obstacle gain" effect in paths over which high frequency waves can be propagated in mountainous regions is reported.

➤ BOTH HOME television viewers and the military will benefit from the most recent discovery in "line-of-sight" radio waves reported to radio engineers meeting in Washington.

A "tremendous increase" in transmission of very high frequency radio waves over very long paths in mountainous regions has been found. Radio experts of the National Bureau of Standards, the Signal Corps and RCA Laboratories have just begun studying these long-range paths during the last two months.

The discovery means that people in mountainous regions where TV and FM reception was thought impossible may now be able to receive clear pictures and signals from transmitting towers placed 200 miles and more away if the transmitters are properly placed in relation to the newly discovered radio paths. And the military can get clear reception on radio messages over the same distances in such mountainous places as Alaska, Japan and Hawaii.

Reception of high frequency signals far beyond the horizon has previously been reported occasionally, but investigators had dismissed such events as irregular and undependable.

Now the radio experts have found that the radio signal is strong, transmission loss and fading are reduced "over very long paths across mountain terrain." They know of no other propagation phenomenon that involves such a tremendous increase in power — about 10,000,000 times as much power as without the effect.

The study is so new that the scientists will not predict just how far what they call the "obstacle gain" effect will carry, but they believe it would be more than 200 miles. Nor are they sure exactly how high are the frequencies thus affected. Their experiments have been carried on in the 38 to 160 megacycle range, but calculations show the effect would be just as great for 1,000 megacycles and perhaps over that.

Although their discovery brings good news to one section of military and civilian operations, it may mean trouble for another: Present proposals are to use frequencies around 1,000 megacycles for air navigation. The new long-range effect would mean interference patterns from stations too close together could be set up. These would be a considerable nuisance, and possibly dangerous, to pilots navigating with radio aids using such proposed frequencies.

The experiments were conducted by Frederic H. Dickson of the U. S. Signal Corps, John J. Egli of the Signal Corps Engineering Laboratories, Jack Herbstreit of the National Bureau of Standards and Gilbert S. Wickizer of Radio Corporation of America Laboratories.

The extra-long propagation path in mountainous areas would also apply to the ultra high frequencies to which television bands are scheduled to switch sometime in the future.

Being too close to a mountain, however, could be a disadvantage, the engineers warn. The mountain acts like a knife edge, bending the radio waves around it by diffraction to give good reception over long distances out beyond the obstacle.

Daily and seasonal variations of the phenomenon are now being investigated by the National Bureau of Standards' Central Radio Propagation Laboratory, Boulder, Colo.

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• RADIO

Saturday, May 16, 1953, 3:15-3:30 p.m. EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Stephen J. Toth, associate professor in soils, Rutgers University, New Brunswick, N. J., discusses "Recent Advances in Soil Chemistry."

MINERALOGY

New Uranium Mineral Named for Chemicals

➤UMOHOITE IS the synthesized name of a newly-found natural uranium mineral announced by Prof. Paul F. Kerr of Columbia University, New York. Found so far in only one Marysvale, Utah, mine, it contains 48% uranium, compared with 50% to 65% in the usual pitchblende ore. Its name comes from the elements in it, the chemical symbols for uranium, U, molybdenum, Mo, and hydrogen, H, and oxygen, O, in water, plus the suffix used for minerals, "ite."

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PUBLIC HEALTH

No Radioactive Cosmetics

➤ RADIOACTIVE CHEMICALS, or radioisotopes, "have no place in cosmetics because of the danger associated with their use," W. B. Rankin of the U. S. Food and Drug Administration declared at the Oak Ridge Institute of Nuclear Studies, Tenn.

FDA allows the use of such chemicals in drugs, however, when satisfactory evidence of their safety has been presented. Some drugs with radioactive chemicals in them are now being legally shipped in interstate commerce.

One firm, Mr. Rankin said, is producing and distributing material quantities of radioactive iodine, called iodine 131, for use in the study and treatment of certain thyroid disorders.

The case for radioactive chemicals being put into foods or used for sterilization of foods and drugs requires more study. Cold sterilization of food by radioactivity is "an attractive goal," Mr. Rankin said, but more information is needed on whether the irradiation would lessen the nourishing value of the food or the remedial activity of the drug. Bonds in complex compounds might be disrupted to give entirely different chemicals which might or might not be harmful.

Whether foods or drugs sterilized by irradiation are poisonous in any way, for example, whether they could produce cancer if taken over long periods, must also be determined before such sterilization methods could be considered safe.

Use of radioisotopes as tracers in food manufacture, for example, to check the thoroughness with which a small amount of an important ingredient is incorporated in a large mix of food, might be useful and reduce production costs. But unless it can be shown that such use of radioisotopes will not be dangerous to the consumer and that there is a manufacturing problem which can be solved only by the use of a radioisotope, such use would not be permitted.

Radioisotopes can be used in treatment devices or machines legally if these have adequate directions for use, precautions against misuse and are used under competent medical supervision.

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CHEMISTRY

List Variety of Atoms For Sale by Oak Ridge

➤ FOR SALE: Atomic radiation in the form of radioactive isotopes of chemical elements, more than a hundred of them. Also 175 isotopes or atomic varieties that are not radioactive but stable are on sale by the Oak Ridge National Laboratory.

A new catalogue, the first since 1951, shows prices as low as $5 per curie for radioactive cobalt in large quantities. This isotope is used as a substitute for radium and X-rays in industry and medicine, including cancer treatment.

Radioisotopes and stable isotopes are used in medicine, agriculture, industry and other research.

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NEUROLOGY

Wipe Out Cancer's Pain

Electrical jolt from wires in brain of cancer patient brings relief from excruciating pain, experiment with one patient shows. Effect lasts about a week.

➤ THE HORRIBLE pain which is a result of cancer in its last stages before death has been wiped out in one patient with small electric currents sent through the deep regions of the brain.

Tiny electric wires, directed three inches into the brain through small holes in the skull, carried the currents to the region below the cerebral cortex, which is where our learning and planning activities take place. One small jolt of the current, two milliamperes, instantly cleared away the pain.

A movie of the process was shown to science writers on a tour of cancer research centers by Dr. Robert G. Heath, professor of psychiatry and neurology at Tulane University, New Orleans. Two hours before the movie was shot, the patient, suffering from incurable cancer of the uterine cervix, had been given a large dose of morphine. Yet her features were drawn and suffering with pain. The instant the current was applied she felt relief.

"I feel wonderful," she said. "I feel like getting up and cleaning up the whole hospital."

The effect of the first small jolt lasted about two weeks. Since then, about two months ago, she has had the treatment about every four days to one week. Down to only 75 pounds in weight, unable to move from her bed before the treatment was begun, now she is up to 81 pounds, is walking around the hospital ward and hopes to be allowed out of the hospital to go to a movie soon.

Dr. Heath emphasized that this was entirely different from another method used on the brain of intractable pain sufferers. The other method, called a prefrontal lobotomy, cuts away from the rest of the brain that part which can look into the future. Since much of what we call pain is actually anticipation of the next twinge, after this operation the pain still exists, but the patient no longer cares about it. However, he no longer cares very much about anything else, either.

On the other hand, Dr. Heath's patient has had no part of her brain damaged or cut off from operation. What he is trying to do, he explained, is to find a connection between the emotion of pain and what kind of chemical changes go on in the body when we feel that emotion. With his electric current, he has stimulated the deep regions of the brain. Chemically, he has achieved a reaction much similar to that with which the body responds to fear. In his patient the output of the hormones from the adrenal cortex was considerably increased after application of the electric jolts. The activity of one part of the brain, as measured electrically, was also changed, the change lasting as long as the pain stayed away.

When asked whether the treatment had affected the patient's cancer in any way, Dr. Heath said: "I don't know."

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METEOROLOGY

Tornado Birth Caught By Radar Movie Camera

➤ FOR THE first time, the birth and growth of a Midwestern tornado has been recorded by a radar movie camera.

The movies, taken of the TV-like screen of the radar tracking the storm, were shown to the American Meteorological Society Meeting in Washington. Two striking things were seen in the movie by Glenn E. Stout, senior meteorologist for the Illinois Water Survey which took the movies. First, he said, the tornado, which developed out of a thunderstorm, started in the rear edge of the storm, rather than the leading edge. Second, just before the tornado developed, the trailing edge of the thunderstorm was sharp and clear, indicating that turbulence existed there.

The tornado developed approximately ten miles north of the radar station at Champaign-Urbana, Ill., on April 9. The radar operator noticed that the thunderstorm developed a sort of tail which then curled into a cyclonic whirlpool.

They found that what they were tracking and photographing was actually a tornado when news flashes told of destruction exactly in the path over which they tracked the curling tail.

Now the movies will be studied in efforts to learn more about the formation of tornadoes and to find some clues for predicting their probable occurrence.

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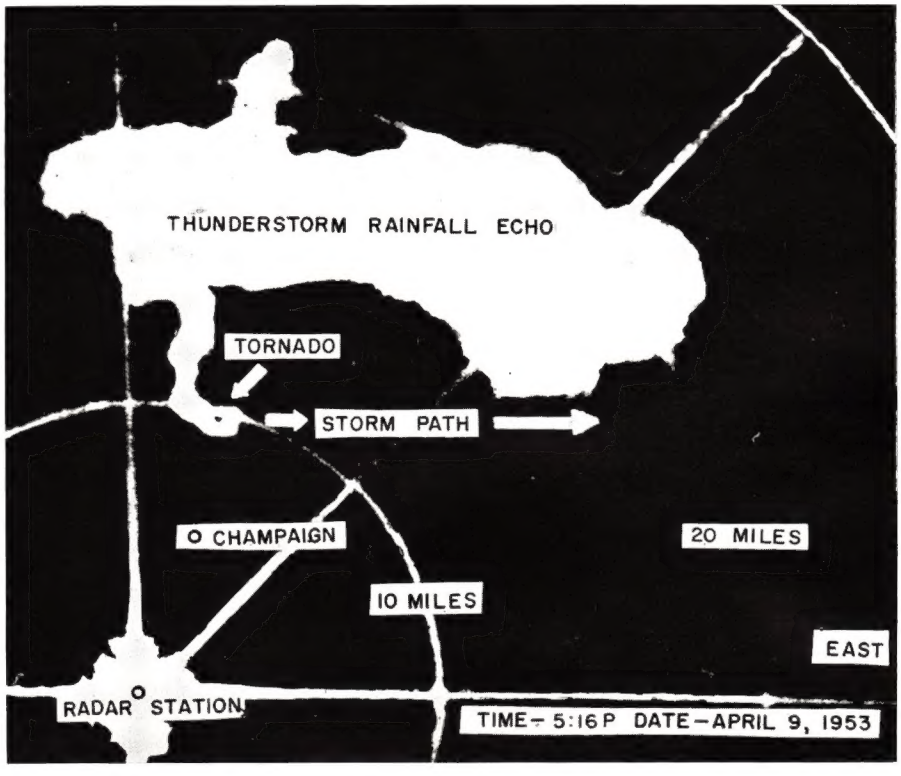
OPHTHALMOLOGY

3-D Movies Find Eye Trouble Never Suspected

➤ SOME PEOPLE who go to see three-dimensional movies are going to find they have eye trouble they have never suspected. The trouble will not be caused by the motion pictures but detected by them.

"Movies of the type in which either polaroid or colored glasses are worn become



TORNADO ON RADAR—Pictured here is the first radar picture ever taken of a developing midwestern tornado. The projecting tail curled to form the tornado.

three-dimensional only if the two eyes work well together," Dr. Franklin M. Foote of the National Society for the Prevention of Blindness, New York, told SCIENCE SERVICE.

"If there is significant heterophoria (tendency to squint or for one eye to turn out or in) or if there is some loss of vision in one eye, there may be no three-dimensional effect. Therefore this kind of movie will help in the detection of these kinds of unsuspected eye conditions.

"Persons who get no three-dimension effect should obtain a thorough professional eye examination," he advised.

This probably does not apply to the large screen three-dimensional movies like "Cinerama" because their effect is based on a person's previous experience and the life-like appearance of the image.

Dr. Foote does not think that any of these movies will harm the eyes, though as with other visual tasks, fatigue will occur after long viewing.

Hollywood cameramen, directors and film technicians have been applauded for their work in developing three-dimension movies because of the aid these will be in detecting unsuspected eye troubles. This applause came from R. A. Sherman of the Bausch and Lomb Optical Co., Rochester, N. Y., who spoke at the meeting of the Society of Motion Picture and Television Engineers.

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METEOROLOGY

Better Visibility Forecasts

➤ MORE AND safer bad-weather landings at crowded airports are foreseen from studies being made at Washington National Airport reported to the American Meteorological Society meeting in Washington.

Better forecasts for up to about ten minutes when visibility is bad are now being made on a trial basis using two new instruments, a ceilometer and a transmissometer, Wayne F. Staats of the U. S. Weather Bureau told the meteorologists.

The bottom of a cloud ceiling is not smooth and flat, but rough and jagged, sometimes changing as much as 300 feet in 24 seconds. Goal of the year-long studies, started last January and sponsored by the Air Navigation Development Board, is to tell the pilot just where and when he will be able to break through the overcast to see the airport and landing runway.

The ceilometer was described to the meteorologists by its inventor, Ruben H. Guenthner of the Weather Bureau. Developed jointly with L. W. Foskett, also of the Weather Bureau, the ceilometer is a "light-radar." It sends a pulsed beam of light upward, then catches the reflections from the bottom of the cloud. Heights of the cloud base are indicated every 24 seconds on a cathode ray tube.

A remote television pickup camera was also tried in an effort to lick the problem of extreme changes in cloud base height, Louis P. Harrison of the Weather Bureau reported. Calibration difficulties must be solved before TV can be used successfully for determining airport visibility during bad weather periods.

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PSYCHOLOGY

Parents Need Assurance

➤ MANY PARENTS these days are confused and "uneasily self-conscious" about bringing up their children. They need some reassurance from the child psychiatrists, psychologists and educators who have upset them, says Dr. Leo Kanner, director of the children's psychiatric service at the Johns Hopkins Hospital, Baltimore.

Parents have been taught over the past couple of generations that the "Mother knows best" and "Spare the rod and spoil the child" attitude in child rearing may be harmful to the child. They have got away from letting the clock and the scales and schedules rule them and their babies. But many of them are now floundering, waiting for some new pronouncement or set of rules for raising children. Dr. Kanner says there has been produced a generation of parents who wail: "It is all our fault but what can we do?"

Mother may not "know best" just because she is mother, but she and father, too, must be helped to feel more self-reliant and self-confident about handling their children, Dr. Kanner points out. It should help them to read and think about and remember the following from Dr. Kanner's report to the U. S. Children's Bureau publication, "The Child":

"We have learned the simple truth that any child has a good chance for satisfactory mental health, regardless of physical condition and I.Q. and other circumstances, if he can from the beginning of life feel that those closest to him like him, want him, and accept him as he is.

"We have also learned that it is not only severe cerebral and endocrinologic disorders that can work havoc with the mental health and adjustment of human beings; personality and behavior disorders can also result from the attitudes of parents who are markedly rejecting, disapproving, exploiting, perfectionistic, overprotective, or overpossessive."

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AGRICULTURE

DDT Accumulations Could Harm Plants

➤ ACCUMULATION OF DDT in farm soils may retard plant growth, warns Dr. Joseph M. Ginsburg, entomologist with the New Jersey Agricultural Experiment Station, New Brunswick.

In fields of sandy soil where an average of 50 pounds of DDT per acre had been sprayed over five years time, Dr. Ginsburg found from six to 12 pounds of DDT per acre in the top one foot of soil. Concentrations of 12 pounds of DDT per acre could be near the danger point for many plants.

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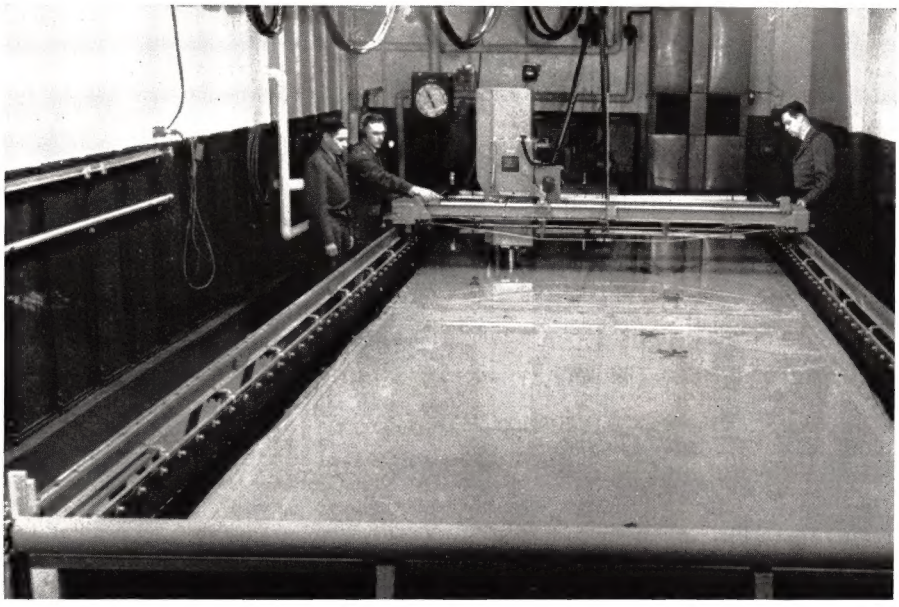

SIMULATE RADAR BOMBING—To give a navigator-bombardier trainee the effect of actual flight over terrain represented by map, a simulated airplane moves over a submerged relief map in the tank room of this new trainer device.

AERONAUTICS

Pinpoint-Bombing Trainer

Ultrasonic sounds from a simulated radar antenna bounce off a relief map submerged in water. The resulting picture is realistic, even to scudding clouds.

➤ AN ELECTRONIC machine has been developed for the Air Force to increase the pinpoint bombing skill of experienced bombardiers.

The complex instrument, which is housed in an entire building of its own, makes it possible to "bomb" actual targets anywhere in the world without leaving the ground.

Designed and built by American Machine and Foundry Company under supervision of technicians at the Wright Air Development Center, Dayton, Ohio, the trainer uses a large relief map of the area being "flown" over by the plane. The map, representing a 360,000-square-mile area, is submerged in a tank of purified, temperature-controlled water.

A simulated radar antenna is submerged in the water and emits ultrasonic sounds instead of regular radar waves. The antenna represents the plane's antenna as it scans the countryside below.

Meanwhile the student is tucked away in a special booth outfitted to resemble his position in a bomber having the latest model bombsight. The student watches the progress of the plane on his radar scope. When the target is reached, he can release his "bombs" in the customary manner. He can see on his instruments a corresponding view of what he would see if he were actually flying. Even scudding clouds can be added to the picture.

While all this is going on, the machine makes records showing the flight path of the plane, the time the bombs were released and the curve followed by the falling bombs. In figuring out the bomb curve, the machine takes the wind speed into consideration. The records can help the trainee improve his accuracy.

Since some bombardiers also are navigators, the simulator also is equipped to reproduce "friendly" radio beacon signals. If the instructor desires, he can introduce "enemy" radar jamming to make the problem more realistic.

The technical key to the machine lies in the fact that ultrasonic waves travel through the water only 1/200,000 as fast as radar waves speed through air. By using the water tank and an ultrasonic "radar" antenna that slowly moves through it, engineers could shrink the map to 1/200,000 the size of the area it represents.

Ultrasonic waves behave in the water exactly as radar waves behave in air. They are bounced back by the features of the relief map. They are converted into a conventional picture which the bombardier sees on his radar screen.

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MEDICINE

Raise Blood Pressure To Help MS Patients

➤ TREATMENT TO raise the blood pressure and stimulate the circulation was advised for multiple sclerosis patients in a report by Dr. I. Mark Scheinker of Cornell University Medical College at a conference of the New York Academy of Sciences and the National Multiple Sclerosis Society in New York.

This so far incurable disease of the central nervous system afflicts a quarter of a million people in the 20- to 45-year-age group. Destruction of the fatty sheaths around nerve fibers in various parts of the brain and spinal cord causes the symptoms which range from double vision to such severe muscle incoordination that patients may become bedridden.

Although the cause is unknown, Dr. Scheinker believes that paralysis of the walls of small blood vessels and their engorgement with stagnant, clotting blood plays a part. He found about two-thirds of all early, microscopically small multiple sclerosis damage spots located close to blood vessels in the paralyzed and engorged condition.

Out of 250 multiple sclerosis patients, 134, more than half, had markedly low blood pressure.

These two findings led him to the idea of treatment designed to raise blood pressure and stimulate circulation so as to counteract the blood vessel trouble that results in stagnation of blood and slowing down the flow to the brain.

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ELECTRONICS

Electronic "Brain" Plans Supply Problems Faster

➤ BETTER AND faster planning of Navy supply problems is foreseen through use of a new logistics computer unveiled recently at George Washington University.

Such weapons as radar, guided missiles, rockets and jets have tremendously increased the paper work involved in putting and keeping them in operation. The staggering record-keeping job is, however, less important than that of relating production material requirements to national resources.

The logistics computer will greatly speed up the handling of such data. It was developed jointly by the University, the Office of Naval Research and Engineering Research Associates, Inc.

It operates in a manner quite typical of all computers. Data are put into the "brain" by coded punched tape. An arithmetical unit performs the desired calculations, storing intermediate results as they are computed. The result comes out of the computer on punched tape and is converted to typewritten data by a tape reading machine.

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GENERAL SCIENCE

Academy Elects Members

Thirty scientists are elected to membership in National Academy of Sciences. Wilder Penfield is one of the two foreign associates elected this year.

➤ THIRTY MEMBERS, two foreign associates and two new members of the Council were elected at the National Academy of Sciences annual meeting in Washington.

The newly elected members of the Academy are: Lars V. Ahlfors, professor of mathematics, Harvard University; Percival Bailey, professor of neurology and neurosurgery, University of Illinois School of Medicine; H. Albert Barker, microbiologist, University of California; Hugo Benioff, professor of geophysics, California Institute of Technology; J. H. Bodine, professor of zoology, University of Iowa; Leon Brillouin, director of electronics education, International Business Machines Corporation; M. J. Buerger, professor of mineralogy and crystallography, Massachusetts Institute of Technology; H. E. Carter, professor of biochemistry, University of Illinois; J. P. Den Hartog, professor of mechanical engineering, Massachusetts Institute of Technology; David M. Dennison, professor of physics, University of Michigan; Jesse W. M. DuMond, professor of physics, California Institute of Technology; Carl Eckart, director of Marine Physical Laboratory, University of California; Robert Emerson, research professor in botany, University of Illinois; John F. Enders, chief of the division of infectious diseases, Children's Hospital, Boston; Paul J. Flory, professor of chemistry, Cornell University; G. Gamow, professor of theoretical physics, George Washington University; Viktor Hamburger, professor of zoology, Washington University; Einar Hille, professor of mathematics, Yale University; Joseph Oakland Hirschfelder, professor of chemistry, University of Wisconsin; James G. Horsfall, director of the Connecticut Agricultural Experiment Station; Edwin H. Land, president of Polaroid Corporation; David P. C. Lloyd, member of the Rockefeller Institute for Medical Research; Henry W. Nissen, associate director, Yerkes Laboratories of Primate Biology; David Rittenberg, associate professor of biochemistry, Columbia University; J. F. Schairer, physical chemist, Geophysical Laboratory, Carnegie Institution; Theodore Shedlovsky, member of the Rockefeller Institute for Medical Research; J. C. Street, professor of physics, Harvard University; M. Tishler, director of development research department, Merck and Company, Inc.; Harland G. Wood, head of department of biochemistry, Western Reserve University; and R. B. Woodward, professor of chemistry, Harvard University.

New foreign associates elected are: Jan Hendrik Oort, director, Observatory of Leiden, Leiden, The Netherlands, and Wilder Penfield, professor of neurology and neurosurgery, McGill University, and director, Montreal Neurological Institute, Montreal, Quebec, Can.

Dr. George W. Corner of the Carnegie Institution of Washington, Baltimore, was elected vice-president for a four-year term beginning July 1, 1953. He succeeded Dr. Edwin B. Wilson.

In addition to the vice-president, other officers of the Academy, all of whom are members of the Council, are: president, Detlev W. Bronk; home secretary, Alexander Wetmore; foreign secretary, Roger Adams; treasurer, William J. Robbins.

Drs. Edwin B. Wilson, Harvard School of Public Health, Boston, and Hugh L. Dryden, National Advisory Committee for Aeronautics, Washington, were elected to membership on the Council of the Academy to serve for three years. Other members of the Council are Drs. J. W. Beams, Robert F. Loeb, W. W. Rubey, E. C. Stakman, and Wendell M. Stanley.

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GENERAL SCIENCE

Setback to Defense If Research Diverted

➤ THE NATION'S defense program will suffer a severe setback if Defense Secretary Charles Wilson does not give in to the expected demands by Defense Department agencies to have their research programs at the National Bureau of Standards continued.

He has ordered the military not to place any more scientific research projects with the bureau or other government agencies without clearance from him.

Secretary Wilson's action will probably precipitate a slow but steady loss by the bureau of its top scientists and technicians. Cutting down on the bureau's work on defense projects means a scattering of the scientific teams that have proposed, planned and worked together on promising research programs.

Bureau personnel continually receive tempting offers from industrial companies such as Westinghouse and Hughes Aircraft Corp. Most such offers are turned down because the scientists have a high sense of loyalty to the government and to their work. With such an uncertain future on their projects, enhanced by the furor surrounding the dismissal and reinstatement of Dr. Allen V. Astin as bureau chief, it is understandable that the scientists should look with more favor on such offers.

Recent job offerings, representative of those constantly being received at the bureau, have been: a jump of $20,000 a year to a man now making about $10,000, an increase of $7,000 to a man making $8,000 and a raise of $4,500 to a man making $9,500.

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GENERAL SCIENCE

Academicians Back Astin in Standards Fight

➤ THE NATIONAL Academy of Sciences, the top organization in American science, has aligned itself firmly behind Dr. A. V. Astin and the National Bureau of Standards in the now famous attempt of the Eisenhower administration to inject political pressure in this important government bureau.

The academicians at their annual meeting in Washington approved overwhelmingly the action of their president, Dr. Detlev W. Bronk, in urging that "the integrity of scientific effort and the national interest would best be served by asking Dr. Astin to continue as director of the National Bureau of Standards" at least until scientific committees study the issues involved.

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INVENTION

Patented TV Color Tube Uses Gridwork on Screen

➤ A TELEVISION picture tube has been patented which uses a gridwork of phosphorescent chemicals and metal to reproduce full-color images of video shows on its screen.

The color tube's gridwork consists of tiny lines of phosphors that glow red, green and blue, respectively, when bombarded by electrons from the tube's "gun." Tiny strips of metal separate the groups of phosphors.

As the picture is received, the electron beam sweeps the appropriate phosphor lines. For instance when red appears in the picture, electrons are released which strike the "red" phosphors. When viewed as a whole, the gridwork produces a color picture on the screen.

The system hinges upon making the electron beam travel straight across the screen along the narrow phosphor lines. If the beam gets off the proper phosphor, the color picture will not be as it should.

To keep the electron beam in register with the phosphors, tiny strips of metal are interposed between groups of three phosphors. When the electron beam "jumps the track" and strikes a metal strip, corrections are fed into an auxiliary deflection system of the tube to position the beam where it should be.

Inventor Hunter C. Goodrich of Collingswood, N. J., assigned his patent, No. 2,634,326 to the Radio Corporation of America.

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ELECTRONICS

Rest, Shock Operate To Make "Brains" Work

➤ WHEN THE so-called electronic "brains," which are actually computers of various sorts, stop or balk or become cranky or difficult, the engineers who run them treat them somewhat the way a psychiatrist handles a human mental patient.

First, a "brain" is given a rest, that is, it is stopped. Then it is slowly and carefully put back into operation. This may make it stop making mistakes or remedy its otherwise not operating correctly.

If such gentle "rest cure" tactics are not effective, the operators may resort to a shock treatment, just as some kinds of mental illness are aided by electric shock treatments. The machine is actually given a sudden overvoltage. This may set it to working again.

Sometimes a swift, positive kick will jolt it back into proper operation.

Such treatments failing, the engineers may have to resort to the mechanical or electronic equivalent of surgery. They may tear out a part or several parts and replace them or repair them, with even greater facility and ease than a surgeon can operate on the human body.

Sometimes machines fail to operate for very simple reasons. Beside a complex mechanism in a government laboratory this advice is posted: "Plug it in. Turn it on. Check the fuses."

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ASTRONOMY

Stars and Moon Now Photographed Clearly

➤ CLEAR PICTURES of the moon in its exact position against a background of stars have now been made by a new method developed by Dr. William Markowitz of the U. S. Naval Observatory.

With the new type of camera, astronomers are now able, without blurring, to photograph the moon as it races through the sky along with fainter, more stationary stars. It is essential for accurate measurements that the moon and the background stars be photographed simultaneously and without blurring.

Both the moon and the stars are tracked by the new instrument during the 15 seconds or so needed to get the fainter stars to show up on a photographic plate. A dense, tilting filter that cuts out most of the moon's relatively bright light is the key part of the device.

It eliminates all but a thousandth of the moon's light so that the surrounding stars show up clearly. The filter rotates at a regular speed and apparently makes the moon stand still with respect to the stars long enough to get them to show up in detail on the time exposure.

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STARFIRE'S NEW LOOK—Plastic surgery has given a new shape to the nose of Lockheed's F-94C Starfire jet interceptor. The change-over increased air speed five miles an hour.

PSYCHIATRY

Mental Ills Can Be Cured

One authority believes that 85% of the Americans suffering from mental illnesses could be cured if they were given proper treatment in time.

➤ AT LEAST nine million Americans, one in every 16, are suffering from a mental or emotional disorder. Nearly 700,000 victims of serious mental disease crowd our hospitals.

Most of them, as many as 85% according to one authority, could be cured if they could be given the proper treatment early enough.

These facts and figures among other shocking ones were noted by the National Association for Mental Health which sponsors national Mental Health Week during May. The association and its 250 affiliates throughout the country are conducting their first nation-wide fund-raising campaign this year. The money raised—the goal is $5,000,000—will go to improving conditions in mental hospitals, sponsoring new mental health clinics, supporting research and producing materials for mental health education.

This money and these efforts should help to restore some of the millions of mentally sick to health and to prevent mental breakdown in others.

A big part of the preventive work should begin with our children. Parents and other relatives, teachers and the neighbors can all do their share, but first they must learn something of what is needed for a child's mental development to be healthy. On this point Dr. Arnold Gesell of the Gesell Institute for Child Development says:

"Each and every baby has basic traits which declare themselves in patterns of behavior and ways of growth. Every child must do his own growing but we can do much to guide and to direct that growth. By assisting his growth we make him healthier in mind and happier.

"For this reason mental health begins at home. The whole household helps to give the new life a good start. Fathers are taking a new attitude toward problems of child care and discipline. They want to know what makes a young child 'tick.' They look a little less severely upon the shortcomings and the immaturities of early development. This leads to better understanding, and a greater respect for the dignity of the individual even in the tender years."

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TECHNOLOGY

Compensation Claims May Run Into Billions

➤ AMERICAN INDUSTRIAL companies are facing a multi-billion dollar bang made up of compensation claims for hearing loss from noise, Dr. C. Richard Walmer, managing director of the Industrial Hygiene Foundation, Pittsburgh, warned at the Industrial Health Conference in Los Angeles.

He urged industry to meet the threat by better and wider efforts to control noise.

Science News Letter, May 9, 1953

During the winter of 1952-53, about 34% more *waterfowl* remained in Canada than during the previous winter.

BIOCHEMISTRY

Missing Link May Be Pernicious Anemia Factor

➤ A MISSING link in a nutritional chain involved in the manufacture of red blood cells may be an important factor in pernicious anemia.

This is suggested in work by doctors of the University of California at Los Angeles Medical School and the Los Angeles Veterans Administration Center.

In the research a substance known as the B-12 binding factor, which is present in the gastric and duodenal contents of normal subjects, could not be found in the duodenum of persons with pernicious anemia.

Although the exact role of the binding factor is still unknown, it is thought that it may be essential in the absorption and utilization of vitamin B-12. Vitamin B-12 plays an important role in the manufacture of red blood cells, and thus the lack of the binding factor could interfere with this process.

The study also indicated that persons who have had their entire stomachs removed by surgery may not be able to absorb enough B-12 for normal nutrition. The binding factor was not found in duodenal contents of such patients examined in the investigation.

Conducting the research were Drs. Marian E. Swendseid, Herbert Shapiro and James A. Halsted.

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ENGINEERING

George Washington Bridge Takes Top Honors

➤ THE GEORGE Washington bridge has been pegged the number-one engineering "wonder" of metropolitan New York.

The Brooklyn bridge and Empire State building captured second and third places, respectively, in a membership poll of the metropolitan section of the American Society of Civil Engineers.

Ranking the "seven wonders" of the area, the engineers listed these other four:

The New York City subway system, the New York water supply system, the Holland Tunnel and the Brooklyn Battery Tunnel.

The United Nations building ranked eighth, Rockefeller Center, ninth and Grand Central Terminal, tenth. The New Jersey Turnpike ran 13th.

At its opening, Oct. 25, 1931, the George Washington bridge was the world's longest suspension bridge. It has a river span of 3,500 feet. San Francisco's Golden Gate bridge, however, outdid the George Washington bridge by 700 feet in 1937.

The engineers cited the beauty of the George Washington bridge. They also pointed out that 27,979,213 vehicles of one sort or another used it during 1952.

The daring of the Brooklyn bridge's designer and builders in pioneering the way for the many long-span suspension bridges in use today was partly responsible for this "wonder's" second-place rank. The engineers liked the Empire State building for its impressive magnitude.

The "Seven Wonders" of the ancient world were the Pyramids of Egypt, the Hanging Gardens of Babylon, the Phidias Statue of Zeus, the Temple at Ephesus, the Tomb of Mausolus, the Colossus of Rhodes and Pharos lighthouse at Alexandria. All but the Pyramids have been destroyed.

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ECONOMICS

Older People Provide Market for Special Goods

➤ ADD TO the baby market, the newlywed market, the teen-age market, the young business man market and the other consumer groups that are targets for advertising: the oldster market.

In a study of markets and the aging population, the New York Department of Commerce emphasizes that two mature groups, those 45 to 64, and those 65 and over, have special needs.

These "aging" and "elderly" groups place an emphasis on necessities and services rather than durable consumer goods. Medical services are in more demand. They want special housing with an accent on convenience and ease of getting around. Manufacturers were advised in the report to watch for shifts in demand, such as:

Small-scale, multipurpose furniture, food in small packages, dietetic foods, informal clothing stylish to matured wearers, books, periodicals, garden supplies, small-scale home appliances, trailers, smaller and more economical cars, radio and TV, drugs and pharmaceuticals, ophthalmic goods, and photographic equipment.

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PHYSIOLOGY

Hearts Beat Faster At High Altitudes

➤ THE HEART beats faster and pumps more blood through the lungs and out to the tissues at high altitudes. This makes up to some extent for the decreased oxygen in the blood due to the lowered oxygen tension at such altitudes as 19,000 feet and over.

Experiments showing this were reported by Drs. Carl J. Wiggers, Albert Hurliman and Philip W. Hall, III, of Western Reserve University School of Medicine, Cleveland, at the meeting of the National Academy of Sciences in Washington.

Lack of oxygen, it had previously been found, narrows the blood vessels in the lungs. Although this would seem to slow blood flow through the lungs, the Cleveland experiments showed that this was not the case.

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IN SCIEN

BIOCHEMISTRY

Simple Test for Nerve Gas Insecticides Devised

➤ A SIMPLE test for determining when a person is dangerously exposed to war gases or insecticides of the nerve gas or organic phosphate type has been devised by George Limperos and Katherine E. Ranta of Haskell Laboratory of Industrial Toxicology, Wilmington, Del. Such war gases are those most greatly feared for World War III use.

Only a bit of blood drawn from the fingertip is needed to determine the inhibition of cholinesterase activity in the blood that the war gases and insecticides cause. Overexposure to the chemicals results in nausea, vomiting, diarrhea and headache, and the new rapid screening method is needed to pick up whether such symptoms are due to the chemical agents or some other cause. The presence of the dangerous chemical in the blood is told by a color test, it is reported in *Science* (April 24). The test depends upon the use of an indicator for acidity or pH, brom thymol blue.

Science News Letter, May 9, 1953

MEDICINE

Blood Surplus in Liver In Sudden Allergy Deaths

➤ TOO MUCH blood trapped in the liver may be partly responsible for sudden death in severe allergy reactions, Drs. Walter S. Burrage and John W. Irwin of Massachusetts General Hospital and Harvard Medical School, Boston, announced at the meeting of the American College of Allergists in Chicago.

This sudden allergic death is also known as anaphylaxis.

The Boston doctors made their discovery in a study of guinea pigs made allergic to egg white protein. They watched the flow of blood through the animals' liver, using special techniques and high powered microscopes.

When a tiny amount of egg white was injected into the already egg-white allergic guinea pigs, tiny blood vessels in the liver went into spasm within seconds afterwards. This prevented blood from flowing out of the liver though for a time blood continued to flow into the liver.

The liver rapidly filled with blood and shortly thereafter allergic spasm of other blood vessels stopped further flow of blood into it.

The large volume of blood trapped by the liver was not available to the rest of the body and within a few minutes the animal died.

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CE FIELDS

SURGERY

Spot Breast Cancer Responding to Surgery

➤ DOCTORS CAN now tell in advance whether a woman with widespread breast cancer will be helped by removal of the adrenal glands, producers of the arthritis remedy, cortisone.

They can tell this by microscopic examination of the cancer. If it is the kind that forms tiny glands, frequently with a bit of secretion in them, the cancer will respond to removal of the adrenals and the patient will get better, Dr. Charles Huggins of the University of Chicago reported to the National Academy of Sciences meeting in Washington.

The cancers with the tiny glands in them are being stimulated by female hormone from the adrenal glands. Even when the ovaries have been removed or when the woman is past the age when her ovaries are functioning, the adrenals produce enough female hormone to stimulate this particular kind of breast cancer so that it recurs after it has been removed surgically or by X-rays.

Other kinds of breast cancer do not respond to removal of the adrenal glands and ovaries. Patients with this type of cancer will not be helped by the operation.

The cancers that are stopped by removal of the adrenals must, Dr. Huggins pointed out, also be mature enough to respond to withdrawal of the female hormones.

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MEDICINE

Cortisone Treats Prostate Cancer Without Surgery

➤ DOCTORS HAVE developed a hormone treatment that does for the prostatic cancer patient the same thing as removal of the adrenal glands—but without surgery.

The hormone used is cortisone, famous for the relief it gives some arthritis patients. By giving a steady oversupply of cortisone, doctors are able to "hoodwink" the pituitary gland into making the adrenals stop producing sex hormones whose presence allows some cancers to grow.

Drs. Gerald M. Miller and Frank Hinman, Jr., of the University of California School of Medicine described the technique to the Western section meeting of the American Urological Association in San Francisco.

The technique has been used successfully in 10 patients. Remissions in the prostate cancers average about three months. In three patients who were not helped, surgery was used with success.

The doctors explained that the pituitary produces ACTH, which stimulates the adrenals to produce cortisone and the sex steroid hormones. When the normal adrenals start producing too much cortisone, it signals the pituitary to slow down on the output of ACTH.

The pituitary obeys, and this signaling mechanism keeps the body's hormone supplies in balance, normally.

The doctors figured they could use this mechanism to fool the pituitary. They reasoned that if the body has a steady artificial oversupply of cortisone, signals would be set up to get the pituitary to stop producing ACTH. With no ACTH, the adrenals would become dormant, and stop producing the sex steroids that allow cancer to grow. It worked.

The benefits reported are comparable to those reported by a New York Memorial Hospital group who used surgical removal of the adrenals. The use of this operation for cancer was conceived and first put to trial by Dr. Charles Huggins of Chicago.

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TECHNOLOGY

Plastic Dishes Hardened With Electron Beams

➤ PLASTIC DISHES, made of polyethylene, and flexible bottles of the same material can be toughened by bombardment with powerful electron beam, Dr. C. G. Suits, General Electric director of research, revealed in New York. They can withstand sterilizing steam.

This curing process allows use of the plastic in containers for packaging drugs and fluids, like blood, that have previously had to be packaged in easily sterilized glass. Dishes that would wilt disastrously under automatic dishwashing retain their shape when electron hardened.

Fifteen seconds exposure, possibly automatically, hardens the plastic by cross-linking the long, chain-like molecules, or polymers as they are called.

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MEDICINE

Blood Cells Test Shows Allergy to Germs

➤ WHITE BLOOD cells that die and turn red within 17 hours give doctors an easier way to detect allergy to bacteria in a test devised by Dr. Herman Blatt of Cincinnati, and announced at the meeting of the American College of Allergists in Chicago.

When the white blood cells of a patient suspected of having such an allergy are incubated with the offending bacteria, more than 25% of them are killed within 17 hours, as shown by deep red staining of their nuclei. If the person is not allergic to the bacteria under test, most of the white blood cells will survive 17 hours of contact with the bacteria and the neutral red dye will not stain their nuclei.

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TECHNOLOGY

TV Film Scanner Steps Up Telecast Picture Quality

➤ THE PICTURE quality of movies broadcast to home television sets may be improved in the next year or so by a new gadget called a film scanner.

The device is said to produce a better video picture than present equipment. It can be adapted easily to capture the brilliant hues of Technicolor films when color TV finally gets rolling.

Developed by the Philco Corporation, the scanner junks some of the principles now used. The film runs smoothly through the machine, not in frame-by-frame jerks. A rotating many-sided glass prism fades one frame into the other.

Today's movie projectors use a shutter to interrupt the light while the film is pulled down a notch. This gives a slight flicker or stroboscopic effect to movies. But since the spinning prism does not shut off the light, it creates no flicker.

The machine also uses a "flying spot scanner" to take the picture from the film. The movie first is projected on the face of a picture tube similar to those in home sets. A "flying spot" of electrons scans the screen from inside the tube. This converts the movie into electrical impulses that wind up on home TV screens.

Delegates to the National Association of Radio and Television Broadcasters and the Society of Motion Picture and Television Engineers meeting in Los Angeles saw the film scanner demonstrated. Both black-and-white and color runs were conducted. Philco reported the machine would go into production late in 1953.

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GEOLOGY

Canyons on Atlantic Floor Are Predicted

➤ FUTURE DISCOVERY of an almost innumerable series of canyons on the floor of the Atlantic was predicted by Dr. William Herbert Hobbs, veteran University of Michigan geologist, before his death last fall.

They were cut in what is now water-covered territory by rivers of water melted from the great Greenland glacier of Pleistocene or Ice Age time. Dr. Hobbs explained in *Science* (April 24) that the glacier that composes Greenland was in those days much larger and surrounded by land left unsubmerged by the withdrawal of water taken out of the seas to make the Ice Age glaciers. There was then a land bridge between Europe and America in which the canyons were cut.

Dr. Hobbs' comments were inspired by the discovery last summer by Drs. Maurice Ewing and Donald Spurr of Columbia University of some such canyons on the Atlantic floor.

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ENTOMOLOGY

17-Year "Locusts" Emerge

Periodical cicadas, misnamed "locusts," will appear by the millions this spring over eastern United States after 17 years underground. Their numbers will be amazing.

See Front Cover

By HORACE LOFTIN

➤ THIS IS the big year for 17-year cicadas, or "locusts." After spending 17 years of adolescence hidden below the ground, the great brood X will soon be emerging into the world of sunlight. The lazy males will sing and the females will lay their eggs; and in six short weeks they will all be dead.

These periodical, or 17-year, cicadas, will spring from the soil of wooded areas in most of the country east of the Mississippi. One such cicada, of which there will be millions, is pictured on the cover of this week's SCIENCE NEWS LETTER.

The farmers who think a disastrous "plague of locusts" has descended upon them will be greatly mistaken. The rather inoffensive periodical cicadas were greatly wronged when someone first called them locusts. True locusts, the kind that sweep across a field in clouds, destroying every green thing, are grasshoppers, equipped with very efficient jaws with which they can strip a plant bare in no time flat.

Cicadas, on the other hand, have no biting mouth parts. They do have a sort of snout, or proboscis, with which they can suck plant juices. However, it is generally believed that the majority of 17-year cicadas do not feed at all in their six-weeks' life as an adult. What minor bit of damage cicadas occasionally may do to a few fruit trees is caused by the female, when she pierces branches with her sharp tailpiece, or ovipositor, to lay eggs in the cavity.

This year's crop of cicadas, known as brood X (10), is the biggest and widest-spread of the 17 different broods that emerge, one each year, until the full cycle of 17 years is completed. The broods are numbered I through XVII. The last time brood X was seen was in 1936. The 17-year cicadas emerging this year are the offspring of the 1936 brood.

The cicadas of other broods are generally fewer in number and restricted in area. Brood III, for instance, is almost wholly found in the area around Iowa, Illinois and Missouri. Brood V is concentrated about Ohio, West Virginia and southwestern Pennsylvania. Brood XI, due next year, will mostly be restricted to a tiny area in southern New England.

Scientists think brood X may be the parent brood of all 17-year cicadas.

Let us drop back to 1936 and follow the life of this year's brood X from when they were eggs deposited in a tree branch, through their 17 years underground, until they emerge as full-grown, winged cicadas this spring of 1953.

While papa cicada was carelessly passing away the last few days of his life, singing from a treetop, the conscientious, voiceless mama was busy puncturing paired cavities into the tree branch, slipping about 10 eggs into each hole. This process took her about 45 minutes to complete.

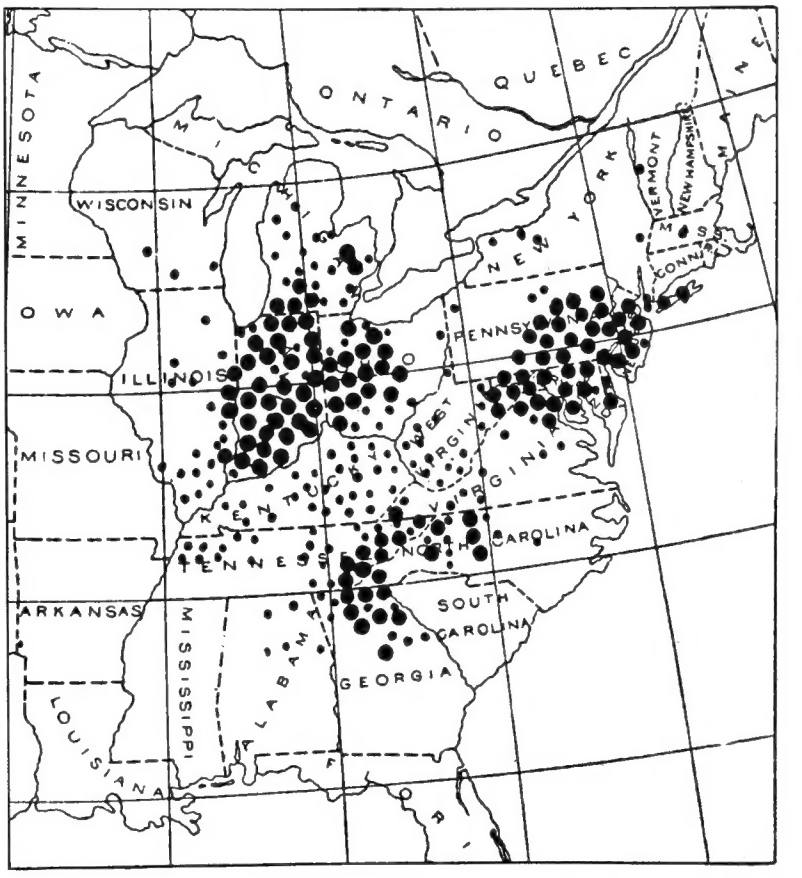
Then she repeated the egg-laying at another spot, repeating the process over and over, until her complete store of eggs, 400 to 600, had been safely deposited. Weakened from her heroic efforts, she soon fell to the ground to die or be eaten by a hungry bird.

The eggs, about one-twelfth of an inch long, remained in the nest for about six or seven weeks. Then, when an egg case ruptured, a tiny larval cicada, barely one-sixteenth inch long, wriggled free and moved about with quick ant-like motions for a few minutes. The larva went to the side of the branch and, seemingly, deliberately loosened its hold and fell to the ground. It was so light that the fall did not injure it at all.

Once on the earth, the larva went underground almost immediately to remain for 17 dark years.

In its new subterranean dwelling, the larval cicada dug about with its oversized front legs until it found a succulent bit of rootlet. It built a sort of case about the rootlet and settled down to suck its juices and pass the years calmly.

Little happened to this cicada in its time underground. Perhaps there were some harrowing moments when it was almost eaten by a carnivorous beetle larva. But more than likely, the monotony of eating and sleeping was broken only by the times it shed its skin. Insects increase in size by molting. The cicada larva shed its skin first about 1938. It molted again around 1940



BROOD X DISTRIBUTION—Where the 17-year cicadas, due to emerge this spring, will be spotted is shown on this U. S. Department of Agriculture map. Broods of other years are smaller, not widely distributed.

CAUGHT IN FLIGHT—The fast beatings of a cicada's wings, 45 times a second, are caught as it flies directly at the camera. Exposure time was 1/25,000 of a second.

and in 1944, at which time it was almost one-half inch long.

A startling change took place with the fourth molt, which happened about 1948. When the fat, soft-bodied larva shed this fourth skin, it emerged as a pupa—a sort of wingless, half-finished model of the adult cicada it would be five years later. There was only one more molt underground, which left the pupa from one to one and a half inches long, as it is today, waiting for the irresistible, nameless urging which will cause it to come into the sunlight this spring, split its old skin and emerge in the adult stage of the cicada.

Besides the 17-year cicada, there is a race of periodical cicadas in the southern United States called the 13-year cicadas. The life history of this cicada is like that of its more northern brother, except that it emerges every 13 years.

The broods of 13-year cicadas are numbered from XVIII to XXX, to keep them distinct from the 17-year cicada broods, I to XVII. This year's brood of the 13-year cicada is XXVI. It will only show up in a few spots in Louisiana, Mississippi and Texas. Brood XXIII is the biggest year for the 13-year cicada—due to appear in 1963.

Disappear by End of July

The periodical cicadas will all be gone by the last of July. Then their cousins, the "dog-day" cicada or the "harvest fly," larger species of cicadas, will take up the singing from the treetops until the end of summer. Little is known about the life history of these other cicadas, except that they are usually around in comparatively small numbers every summer. No one has discovered if they pass a prolonged adolescence beneath the soil like the periodical cicadas.

In spite of many rumors to the contrary, the cicadas are perfectly harmless. They have never been known to "sting" anyone, and they can be handled and studied while alive. The male may even oblige you with a stirring solo while you are holding him.

He makes his "song" by vibrating two little ear-like drums located on the sides of the basal part of his abdomen. A series of sounds have been accredited to the male cicada. First and most common is a sound that can only be described as "tsh-e-e-E-E-E-e-ou," uttered continuously for about a half-minute.

Next is the "Pha-r-r-aoh" song, made early in the season usually. Another is a series of short chirps, which lasts about five seconds.

Cicada's Song Described

Here's how one scientist described the 17-year cicada's singing back in 1851—and how the melancholy song affected him:

"The music or song produced by the myriads of these insects in a warm day from about the 25th of May to the middle of June is wonderful. It is not deafening, as many describe it; even at its height it does not interrupt ordinary conversation.

"It seems like an atmosphere of wild, monotonous sound, in which all other sounds float with perfect distinctness. After a day or two this music becomes tiresome and doleful, and to many very disagreeable. to me it was otherwise, and when I heard the last note on the 25th of June the melancholy reflection occurred—shall I live to hear it again?"

To hear that brood of cicadas sing again, the scientist would have had to live through the period of the Missouri Compromise, the South's secession, the whole Civil War, the assassination of Lincoln and the beginning of Reconstruction. Yet during these 17 hectic years for humans, the cicadas would have been disturbed only by the tread of soldiers' feet on the ground above them.

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It costs less to transport two gallons of *gasoline* by tanker from the Gulf to the Atlantic seaboard than to send a two-cent postcard.

The force of *adhesion* between two materials is believed to reside in a relatively few layers of molecules next to each surface.

• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANALYSIS OF ALUMINUM ALLOYS: A Compilation of Modern Methods—G. H. Osborn and W. Stross, Eds.—*Chemical Publishing,* 144 p., illus., $3.50. A survey of analytical methods, new, modified and standard.

AQUARIUMS—Anthony Evans—*Dover,* 115 p., illus., paper 60 cents, cloth $1.50. Covers fish-keeping equipment, water plants, fish foods, and all types of fish.

THE ARMY AIR FORCES IN WORLD WAR II, Vol V: The Pacific, Matterhorn to Nagasaki, June 1944 to August 1945—Wesley F. Craven and James L. Cate, Eds.—*University of Chicago Press,* 878 p., illus., $8.50. Fifth in a seven-volume series, this completes the narrative of combat operations of the AAF in World War II.

BEGINNING ALGEBRA FOR COLLEGE STUDENTS —Lloyd L. Lowenstein—*Wiley,* 2nd ed., 279 p., $3.50. Intended for the student who has had no background in algebra.

BICYCLE IN THE SKY: The Story of Alberto Santos-Dumont—Rose Brown—*Scribners,* 183 p., illus., $2.50. Tells about the Brazilian pioneer in aviation and his many experiments with balloons, dirigibles and early airplanes. Ages 9-14.

BIRDS AND PLANES: How They Fly—John Lewellen—*Crowell,* 134 p., illus., $2.00. An account of the "hows" and "whys" of flight, natural and mechanical. Ages 10-14.

THE CARE OF CATS—Kit Wilson and Addison Webb—*Dover,* 106 p., illus., paper 60 cents, cloth $1.50. A practical guide for all kinds of cat fanciers.

CHILDREN OF DIVORCE—J. Louise Despert—*Doubleday,* 282 p., $3.50. Covers the effects of marriage failure in its impact on the child. With case histories.

CLOTHES MOTHS AND CARPET BEETLES: How To Combat Them— Agricultural Research Administration, U. S. Department of Agriculture—*Government Printing Office,* 12 p., illus. paper, 15 cents. Describes the many products and methods home owners can use to protect their woolens.

THE DECLINE OF THE ROMAN EMPIRE IN THE WEST—Frank W. Walbank—*Schuman,* 97 p., paper, $1.00. A re-examination of the problem of the causes of the collapse of the Roman Empire, using the wealth of archaeological discovery of the past 50 years.

THE DISTEMPER COMPLEX—Leon F. Whitney and George D. Whitney—*Practical Science,* 219 p., illus., $5.00. The history, symptoms, diagnosis, pathology and treatment of 11 diseases which comprise the distemper complex.

ELECTRONICS IN INDUSTRIAL RESEARCH—Axel H. Peterson—*Mellon Institute of Industrial Research,* 5 p., illus., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

ENCYCLOPEDIA OF ABERRATIONS: A Psychiatric Handbook — Edward Podolsky — *Philosophical Library,* 550 p., $10.00. Discusses all types of aberrations, with particular emphasis on their psychodynamics and legal aspects.

FAITH AND MORAL AUTHORITY—Ben Kimpel —*Philosophical Library,* 186 p., $2.75. The author maintains that the function of moral principles is to help individuals to make choices that contribute to human well-being.

FAUNAL AND ARCHEOLOGICAL RESEARCHES IN YUCATAN CAVES—Robert T. Hatt et al.—*Cranbrook Institute of Science, Bul.* No. 33, 126 p., illus., paper, $2.50. Concerns excavations conducted in caves of Yucatan during 1929 and 1947.

FEUDAL ORDER: A Study of the Origins and Development of English Feudal Society—Marion Gibbs—*Schuman,* 147 p., paper, $1.00. A study of the social order and civilization that played a major part in shaping the history of modern Europe.

FREE AND UNEQUAL: The Biological Basis of Individual Liberty—Roger J. Williams—*University of Texas Press,* 177 p., illus., $3.50. The author believes that we have ignored the facts of genetics in our social and political thinking, and advocates the abandonment of the false concept of "the average man."

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1953—*American Society of Heating and Ventilating Engineers,* 1560 p., illus., $7.50. Contains a technical data section on the design and specification of various systems, and information on modern equipment.

HELPING YOUR HEART—Emanuel Goldberger —*Longmans, Green,* 240 p., $3.75. Explains what heart disease is, how a person can live in spite of an ailing heart, and what he can do to help such a heart and himself.

THE INTELLIGENT USE OF THE MICROSCOPE— C. W. Olliver—*Chemical Publishing,* 192 p., illus., $4.00. A guide to the understanding of the possibilities and limitations of the microscope, its principles of design and the functions of its component parts.

INTRODUCTION TO GEOPHYSICAL PROSPECTING —Milton B. Dobrin—*McGraw-Hill,* 435 p., illus., $7.50. Discusses all geophysical methods of prospecting in current use, with emphasis upon the gravity, magnetic and seismic techniques.

INTRODUCTION TO THE THEORY OF STATISTICS —Victor Goedicke—*Harper,* 286 p., illus., $4.50. Text for a one-semester course in beginning statistics based on the assumption that the student has not had calculus.

LANGUAGE AND MYTH—Ernst Cassirer, translated by Susanne Langer—*Dover,* 103 p., paper $1.25, cloth, $2.25. Intended to prove that reason is an achievement of man, this analyzes the myth-making tendencies of mankind.

LIFE OF THE PAST: An Introduction to Paleontology—George Gaylord Simpson—*Yale University Press,* 198 p., illus., $4.00 A non-technical discussion of how the history of living things is preserved, discovered and interpreted.

THE LOW SODIUM COOK BOOK—Alma S. Payne and Dorothy Callahan—*Little, Brown,* 477 p., $4.00. How to prepare tasteful meals for the low sodium diet, including suggestions for the low sodium, low fat, low cholesterol diet.

THE L-SHAPED STRONGHOLD FENCE STAPLE—E. George Stern—*Wood Research Laboratory, Virginia Polytechnic Institute,* 20 p., illus., paper, free upon request to publisher, Blacksburg, Va. Covers the effectiveness of the L-shaped staple with threaded shank, in comparison with that of the U-shaped staple.

MANUAL OF COMPARATIVE ANATOMY—Osmond P. Breland—*McGraw-Hill,* 2nd ed., $4.50. Includes the Amphioxus, the lamprey, the dogfish, the perch, the Necturus, the turtle, the cat and the pigeon.

METERING LIQUID SULFUR—E. S. Boe, C. E. Butterworth and J. R. West—*Mellon Institute of Industrial Research,* 5 p., illus., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

MICROBIOLOGY AND HUMAN PROGRESS—Madeleine P. Grant—*Rinehart,* 718 p., illus., $6.75. A college text for introductory courses in bacteriology and microbiology.

MODERN MEDICINE ANNUAL, 1953—Walter C. Alvarez, Ed.-in-Chief—*Modern Medicine,* 1414 p., illus., $6.00. The articles that appeared in the 24 issues of "Modern Medicine" during 1952.

NORTH AMERICAN AND EUROPEAN STROPHEODONTIDS: Their Morphology and Systematics—Alwyn Williams—*Geological Society of America,* Memoir 56, 67 p., illus., $1.50.

PETS: Wild and Western—Elmo N. Stevenson —*Scribners,* 163 p., illus., $2.50. Interesting stories of wild animals found in the western states. Ages 8-12.

THE PRINCIPLES OF PHYSICAL METALLURGY—Gilbert E. Doan—*McGraw-Hill,* 3rd ed., 331 p., illus., $5.50. An account of the behavior of metals under the various processes which are performed upon them in the metal fabricating and manufacturing industries.

PROBLEMS IN SELECTING AND PREPARING STUDENTS IN PROFESSIONAL EDUCATION WITH SPECIAL ATTENTION TO STUDENT EXPENSES—Bureau of Educational Research and Service—*Medical College of Virginia,* 87 p., paper, $1.75. Suggests possible means and methods of solutions.

SCIENCE FUN WITH MILK CARTONS—Herman and Nina Schneider—*Whittlesey House,* 159 p., illus., $2.50. By using milk cartons to build bridges, motor cranes, elevators, etc.; children can learn the scientific principles involved in simple engineering. Ages 9 and up.

SILICON: The Cinderella of the Elements—R. R. McGregor—*Mellon Institute of Industrial Research,* 3 p., illus., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

SOCIAL EVOLUTION — V. Gordon Childe — *Schuman,* 184 p., paper, $1.00. Traces the evolution of society and culture from barbarism to civilization.

SOCIOLOGY AND PSYCHOLOGY OF COMMUNISM —Jules Monnerot, translated by Jane Degras and Richard Rees — *Beacon Press,* 339 p., $6.00. Covers the development, theory and practice of Communism.

SPADEWORK IN ARCHAEOLOGY — Sir Leonard Woolley—*Philosophical Library,* 124 p., illus., $4.75. A collection of reminiscences by a great archaeologist, covering briefly the areas in which he excavated.

THE SUEZ CANAL IN WORLD AFFAIRS—Hugh J. Schonfield — *Philosophical Library,* 174 p., illus., $4.50. The history of the Suez Canal from the days of the Pharaohs to the present clashes between Britain and Egypt.

TELLING TREES — Julius King — *William Sloane,* 127 p., illus., $2.00. Describes and illustrates more than 100 common trees of America.

YOUR DIABETES AND HOW TO LIVE WITH IT—Floyd L. Rogers and Ruth M. Leverton—*University of Nebraska Press,* 113 p., paper, $2.25. A doctor and a nutrition expert teamed up to write this guide to a normal life for diabetic patients.

YOUTH: The Nation's Richest Resource, Their Education and Employment Needs — Interdepartmental Committee on Children and Youth —*Government Printing Office,* 54 p., paper, 20 cents. Shows how teen-agers are being helped to get the kind of education and employment opportunities that prepare them for their adult responsibilities.

Science News Letter, May 9, 1953

MEDICINE

1,000 Mice Live in Smog for Cancer Study

➤ A THOUSAND mice are helping out in cancer research by living in enclosed cages which reproduce the most intense smog of our industrial cities. A control group lives in pure mountain air, achieved with glass fiber filters.

Dr. Paul Kotin of the University of Southern California School of Medicine and his associates are trying to find out whether there is anything in smoggy air which produces cancer. At the same time the effects of smog on nutrition and the ability to reproduce will be investigated.

The scientists have to wait until the mice live out their life cycle, about 30 months, to see what results they have.

Science News Letter, May 9, 1953

TECHNOLOGY

Transplanted Natural Gas Solves Load Problem

➤ TRANSPLANTING NATURAL gas from southwestern fields and storing it underground near heavy users is the present answer to the supply problem created by sudden cold snaps.

C. T. Konecny and B. J. Clarke of the Columbia Gas System Service Corp., Columbus, Ohio, told the American Society of Mechanical Engineers meeting in that city that unexpected cold weather causes a heavy demand for gas. Since gas travels through pipelines at low speeds, about 10 to 25 miles an hour, it is difficult to supply these extra heavy demands directly from the pipeline.

Storing gas underground is the present solution. Gas from the Southwest is pumped into storage tanks or suitable abandoned wells and mines. When gas demand is extra heavy, these underground reservoirs can be tapped.

On the peak day for natural gas demand during the winter of 1951-52, over 45% of the Appalachian Gas System's total load was supplied from underground reservoirs near the users.

Science News Letter, May 9, 1953

NUTRITION

Fresh Eggs Are More Nourishing

➤ A FRESH egg for breakfast has long been favored because fresh eggs usually taste and look better than storage eggs. Now scientific tests show they are also more nutritious.

Measurements of nutritive value, as indicated by the presence of folic acid, the growth-promoting vitamin in animal tissues and plant leaves, show that eggs suffer a 16% loss in six months and a 27% loss in a year of cold storage. The tests are reported by Robert John Evans, J. A. Davidson, Doris Bauer, and Helen A. Butts of Michigan State College in the *Journal of Agricultural and Food Chemistry* (April 15).

Previous studies have indicated losses in protein, riboflavin, niacin, vitamin B-6 and pantothenic acid, the scientists report.

Several million cases of eggs are stored in this country during periods of high production, to be used later when production is lower and prices are higher, the report points out. Any changes in nutritional quality of stored eggs are important, but very little is known about the relative nutritive values of fresh and stored eggs, they say.

Eggs from ten White Leghorn hens kept in laying cages and fed a diet of constant composition were used in the experiments. Fifteen eggs were saved from each hen. Three were used for immediate folic acid assay, and 12 were stored in a carton. The ten cartons of eggs were placed in a walk-in refrigerator at 32 degrees Fahrenheit. Eggs were removed for assay after three, six and 12 months of storage. Three eggs from each hen were used for each period.

Each fresh egg contained on the average 4.59 microgram of folic acid. (One microgram equals .000,000,353 ounce.) After three months there was no measurable change, but after six months the average was 3.84 and after a year 3.37 micrograms. There was a loss of folic acid from the egg yolks and some transfer of folic acid from the yolks to the whites during cold storage, the report notes.

Science News Letter, May 9, 1953

ECOLOGY

NATURE RAMBLINGS

See and Shun!

➤ POISON IVY victims begin to become numerous at about this time of year, and they will continue so until frost strips the wicked vine of its foliage.

It is sometimes stated that poison ivy is at its most virulent when in bloom; but most of the afflicted ones can find no seasonal differences in their miseries. Just as many blisters and as much itching in August as in May, they declare.

The malaise of ivy poisoning, ranging from relatively mild discomfort in some to acute and prolonged suffering in the more sensitive, can be largely obviated by attention to a few simple precautions. As in all afflictions, prevention is better than cure, and avoidance of the cause is the key to prevention.

Learn to recognize poison ivy at sight, and keep away from it whenever you see it, and you will reduce the number of attacks per season—perhaps eliminate them altogether.

Poison ivy is easily recognizable by its three-parted compound leaf. It is the only abundant shrubby plant in the woods with that kind of leaf. Flowers are small, greenish-white, thickly clustered; they are followed by berries that become a slightly soiled parchment-white when ripe.

For the Eastern species, there is no valid distinction between poison ivy and poison oak, which is sometimes attempted on the basis of leaflet-shape. Leaflet margins range all the way from entire to deeply notched or lobed—sometimes on different parts of the same vine. Poison ivy is an exceedingly variable species.

The name poison oak is properly applied to the Western species, which is plentiful in the foothills of coastal mountain ranges, and is also found less abundantly inland.

Properly speaking, poison ivy is a vine. In humid woodlands it climbs trees and clambers over rocks and stone fences, clinging by means of innumerable aerial roots. In slightly drier terrain, it disguises its character by running the main stem of the vine along or just under the ground surface, sending up numerous branches that range from a few inches to four or five feet in height, so that it is often described as a shrub. But it's all the same old pesky poison ivy.

Science News Letter, May 9, 1953

SURGERY

Indians Used Anesthetic

➤ SHOWY PLANTS with soft pink and salmony pastel flowers decorating the gardens of the head-hunting Jivaros high in the Andes probably hold the secret of the anesthetic used by ancient surgeons who did skilful trepan operations on the skulls of former inhabitants.

This is the opinion of Dr. W. H. Camp, curator of experimental botany and horticulture in the Academy of Natural Sciences of Philadelphia.

The plants belong to the genus *Datura*. Stramonium and jimson weed are among the *Datura* species. The leaves and seeds yield a powerful narcotic, and Jivaros today grow the plants and use the leaves for this purpose.

The potency of these leaves is attested by an associate of Dr. Camp's during a plant hunting expedition, Henning Jorgensen. A few years ago while panning for gold in the Oriente, Mr. Jorgensen suffered an accidental gunshot wound of the leg. No doctor was available to remove the bullet. The Jivaros took charge, giving him a decoction of *Datura* leaves to drink. He soon became drowsy and when he awoke, about 36 hours later, he found the bullet had been removed and the deep wound poulticed.

"Unfortunately, he could not see," Dr. Camp relates. "He complained about this, but was told to be patient. He said he did not regain normal vision for another four or five days, after which there was no apparent further effect of the narcotic."

Scientists have sometimes said that ancient surgeons had their patients chew coca leaves to deaden pain while their skulls were being trepanned for relief of brain abscesses or similar brain afflictions. Dr. Camp thinks the *Datura* leaf concoction must have been the anesthetic that held the patient still for the "tedious and painful" operation.

He tells the story of Mr. Jorgensen's experience in *Memoirs of the New York Botanical Garden.*

Science News Letter, May 9, 1953

About a billion board feet of *lumber* were destroyed by the Douglas fir beetle in Washington and Oregon during 1952.

VETERINARY MEDICINE

Point Four in Reverse

➤ THE POINT Four program can work both ways: the United States is now receiving technical assistance from veterinarians in South Africa.

When a strange disease struck sheep flocks in California recently, scientists there isolated a virus from sick animals and sent the culture to the Onderstepoort Veterinary Laboratories in Pretoria for identification.

The African laboratory verified the California scientists' suspicions: the disease was the dreaded blue tongue sickness, cause of enormous sheep losses in South Africa for about 80 years. The disease is almost unknown outside of Africa.

Dr. R. A. Alexander, expert on blue tongue and director of the Union of South Africa's Veterinary Services, is now in the United States at the request of the Department of Agriculture to help plan the battle against the disease.

While most of Dr. Alexander's work here will be done in California with the infected flocks, he hopes to visit Texas and Utah, where sheep diseases with symptoms similar to those of blue tongue have been reported.

In Africa, blue tongue is spread by a species of sandfly which harbors the virus. As infections among California sheep decreased with the coming of cold weather, agriculture scientists believe the disease is probably insect-borne in this country too. No active control measures have been taken against blue tongue in the United States yet because of lack of knowledge about it. Dr. Alexander's report of his findings will signal the beginning of the battle.

A vaccine against blue tongue has recently been put into use in Africa. However, a news report from Johannesburg said more than a million sheep have died already this year from the disease.

Blue tongue symptoms show up first in the mouth and mucous membranes of infected animals, causing ulceration and cyanosis. The sheep become emaciated, lame, and the wool is poor. Abortions are frequent. Mortality in infected flocks varies, but generally runs about 10% to 20%.

Science News Letter, May 9, 1953

INVENTION

Expanding Coat Invention

➤ SPRING FASHIONS have hit the U. S. Patent Office as inventive genius turned out an expandable coat that holds two persons, a necktie with interchangeable parts and an adjustable skirt.

The expandable coat, invented by Howard C. Ross of Arlington, Va., is designed to be worn as a topcoat or raincoat. The inventor says it should be handy "in emergencies" when the wearer and his girl friend, for instance, get caught in the rain at a football game.

When that happens, the wearer merely expands the coat and both he and the girl friend scramble inside it. Each person is allotted one sleeve.

The coat has built-in "folding panels" of cloth that are snapped out of the way for normal use of the coat by one person. Two panels are doubled under on the front side, and a zipper arrangement in the rear takes care of the back panels.

The expandable coat was assigned patent No. 2,636,176.

Robert J. Corey of Brooklyn, N. Y., received patent 2,636,178 for his preformed necktie. The neckband, knot and drape portions of the tie are all interchangeable.

The knot is a preformed shell of metal, plastic, bone or any other suitable material. It is molded to resemble a perfect four-in-hand. The knot can be covered with matching or contrasting cloth, or left bare.

The drape material clamps into the knot. The knot holds the drape so that it "stylishly curls and dimples" the drape portion, the inventor says. A cloth neckband holds the assembly around the wearer's neck. On hot days when collars ordinarily are loosened, the neckband can be loosened easily also.

Ethel E. and Jean E. Gillespie of Portland, Ore., had that expanding waistline in mind when they created their adjustable skirt, patent No. 2,636,180.

The idea is to provide skirts and slacks that do not have to be taken to a skilled seamstress to be enlarged. Ordinarily to let out a garment requires that the seam-stitching be removed. Then the garment must be sewed back together. This takes time and sometimes requires the services of a professional seamstress.

To get around the problem, the inventors created a skirt with rows of stitching instead of single seams. To let the skirt out a notch, the wearer merely cuts the first row of stitching with a razor blade. If this does not enlarge the skirt or slacks enough, then the remaining rows can be cut until the garment fits. This can be done quickly, even by the rankest of amateurs, the inventors believe.

The waistband has snaps spaced along it so that it works properly when the skirt is let out.

Science News Letter, May 9, 1953

A second British-controlled *rocket* range has been opened in Australia.

Questions

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ASTRONOMY—Why is it important to photograph the moon and background stars simultaneously? p. 296.

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ECONOMICS — For what special goods are elderly people a market? p. 296.

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Photographs: Cover and p. 298, U. S. Department of Agriculture; p. 291, Illinois Water Survey; p. 293, U. S. Air Force; p. 295, Lockheed; p. 299, Wesley Fuller; p. 304, Magna Engineering Corp.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 673. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

WHEEL LIFT for truck, bus and tractor drivers makes it easy to raise a bulky wheel to the jacked-up axle when changing a flat tire. The lift is made of heavy-duty steel, yet weighs only eight pounds. A lighter model has been designed for use with automobiles. Either model folds into a compact, easily stored package.

Science News Letter, May 9, 1953

INFRARED "BURNER," built into a new electric range, provides an even flow of heat by radiation to all areas of cooking utensils. The 1,550-watt infrared lamp is mounted in a metal reflector covered with glass. Both bulb and glass cover withstand extreme temperature changes without cracking.

Science News Letter, May 9, 1953

THERMOPLASTIC FOR industrial plants filters up to 95% ultraviolet rays and 80% infrared rays out of sunlight, cutting air-conditioning costs in actual installations. The translucent, weather-resistant plastic comes either as a spray-on film, or a sheet plastic.

Science News Letter, May 9, 1953

HOME WORKSHOP combines five major power tools into a unit, shown in the photograph, that can be tucked away in a garage corner. The unit features a circular saw, drill press, lathe, disc sander and

horizontal drill. The versatile tool permits the home craftsman to do 100 different things, among them: plug-cutting, fluting, angle sawing, rabbeting, dowel cutting and ceramic cutting.

Science News Letter, May 9, 1953

RUGGED SEWING kit for patching heavy clothing, rag rugs, canvas, awnings and upholstery consists of a fid, five rust-resistant needles of different sizes, twine wax and three balls of husky sewing twine. The kit is packaged in two clear plastic containers.

Science News Letter, May 9, 1953

PICTURE-HANGING KIT keeps pictures from sagging crookedly after being hung. Four triangular foam rubber cushions stick to the corners of the picture frame's back. The cushions grip the wall to keep the picture level. They also are said to permit air to flow behind the picture, eliminating dusty areas on the wall behind the frame.

Science News Letter, May 9, 1953

COLLAPSIBLE MATTRESSES of rubberized fabric, now in production for the Armed Forces, consist of two separate air chambers that can be blown up orally. For use near the front lines in Korea, the mattresses are designed to make the wounded serviceman more comfortable while receiving medical attention.

Science News Letter, May 9, 1953

MASONRY COATING for home or office buildings helps to seal walls, even those made of cinder block, against moisture. Easy to apply, the polystyrene latex-based coating can be rolled or brushed on fresh plaster and dries to the touch in 30 minutes. It does not peel, chip or crack if the coated surfaces have been properly cleaned first.

Science News Letter, May 9, 1953

Do You Know?

Water in fire-fighting foam puts out *fires* by a cooling effect.

In Korea, *helicopters* have rolled up a record of more than 21,000 casualty evacuations, including 5,000 who probably would have died had it not been for the speedy rescue.

Printed *electronic circuits* promise great savings in the production of future radios, television sets, hearing aids and other electronic devices.

In some instances where sufficient moisture and fertilizer are available, the yield of sweet *corn* will not be affected by keeping the cornfield weeded.

TV now is being applied in Britain to banking, sales instruction, film-making and atomic plants.

The Alaska *salmon* pack has declined in numbers for the past 10 years.